Specifications

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Yes	No

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SPECIFICATIONS FOR A TANKER

1) INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to cover the furnishing and delivery of a complete apparatus equipped as hereinafter specified. These specifications cover only the general requirements as to the type of construction and test to which the apparatus shall conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features. Apparatus proposed by the bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Loose equipment shall be provided only as stated in the following pages.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction. Further, bidder shall maintain dedicated service facilities for the repair and service of products. Evidence of such a facility shall be included in bidder proposal.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified and shall state the location of the factory where the apparatus is to be built. The bidder shall also show that the company is in position to render prompt service and to furnish replacement parts for said apparatus.

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all component parts and equipment.

2) QUALITY AND WORKMANSHIP

The design of the apparatus shall embody the latest approved automotive engineering practices. The workmanship shall be of the highest quality in its respective field. Special consideration shall be given to the following points: Accessibility of the various units which require periodic maintenance, ease of operation (including both pumping and driving) and symmetrical proportions. Construction shall be rugged and ample safety factors shall be provided to carry the loads specified and to meet both on and off road requirements and speed conditions as set forth under "Performance Tests and Requirements". Welding shall not be employed in the assembly of the apparatus in a manner that shall prevent the ready removal of any component part for service or repair. All steel welding shall follow American Welding Society D1.1-96 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum. Flux core arc welding shall use alloy rods, type 7000, American Welding Society standards A5.20-E70T1.

3) DELIVERY

Apparatus, to insure proper break in of all components while still under warranty, **shall be delivered under its own power** - rail or truck freight shall not be acceptable. A qualified delivery engineer representing the contractor shall deliver the apparatus and remain for a period of three (3) consecutive days to instruct personnel in the proper operation, care and maintenance of the equipment delivered.

4) INFORMATION REQUIRED

The manufacturer shall supply at time of delivery, complete operation and maintenance manuals covering the completed apparatus as delivered. A permanent plate shall be mounted in the driver's compartment which specifies the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

5) SAFETY VIDEO

Documentation provided at the time of delivery shall also include an apparatus safety video, in DVD format. This video shall address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus. Safety procedures for the following shall be included: vehicle pre-trip inspection, chassis operation, pump operation, and maintenance.

6) PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts, and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. Vehicle shall adhere to the following parameters:

A) The apparatus, when fully equipped and loaded, shall have not less than 25% or more than 50% of the weight on the front axle, and not less than 50% nor more than 75% on the rear axle.

B) The apparatus shall be capable of accelerating to 35 mph from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed rpm of the engine.

C) The service brakes shall be capable of stopping a fully loaded vehicle in 35 feet at 20 mph on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.

D) The apparatus, fully loaded, shall be capable of obtaining a speed of 50 mph on a level concrete highway with the engine not exceeding its governed rpm (full load).

E) The apparatus shall be capable of passing an NFPA Acceptance Pump Test.

7. FAILURE TO MEET TEST

In the event the apparatus fails to meet the test requirements of these specifications on the first trial, second trial shall be made within calendar 30 days of the date of the first trial. Such trial shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes to conform to any clause of the specifications, within 30 days after notice is given to the bidder of such changes, shall also be cause for rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by the purchaser or its use by the purchaser during the above-specified period with the permission of the bidder shall not constitute acceptance.

8. LIABILITY

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

9. SPECIFICATION BID REQUIREMENTS

Bidders shall also indicate in the "yes/no" column if their bid complies **on each item** (PARAGRAPH) specified. Exceptions shall be allowed if they are equal to or superior to that specified and provided they are listed and fully explained on a separate page.

Proposals taking total exception to specifications shall not be acceptable.

Also, bidders shall submit a detailed proposal. A letter only, even though written on a company letterhead, shall not be sufficient. Bid proposals shall be submitted in the same sequence as specifications for ease of evaluation, comparison and checking of compliance. **An exception to these requirements shall not be tolerated.**

10. EXCEPTIONS

All exceptions shall be stated no matter how seemingly minor. Any exceptions not taken shall be assumed by the purchaser to be included in the proposal, regardless of the cost to the bidder.

11. GENERAL CONSTRUCTION

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles. Weight balance and distribution shall be in accordance with the recommendations of the National Fire Protection Association.

12. NFPA 2004 STANDARDS

This unit must comply with the NFPA standards effective January of 2004.
Certification of slip resistance of all stepping, standing and walking surfaces must be supplied with delivery of the apparatus.

A plate that is highly visible to the driver while seated shall be provided. This plate shall

show the overall height, length, and gross vehicle weight rating.

The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company shall designate in writing who is qualified to witness and certify test results.

13. WARRANTY

The following warranty shall be supplied with each bidder's proposal and be printed on company letterhead.

The manufacturer shall warranty each piece of new fire or rescue apparatus to be free from defects in materials or workmanship under normal use and service. The manufacturer's obligation under this warranty is limited to repairing or replacing, as the company may elect, any parts thereof which are returned to them, with transportation costs prepaid and as to which examination is disclose to the company's satisfaction to have been defective. The part, or parts, shall be returned to the manufacturer not later than **one (1) year** from delivery of the apparatus. Such defective part, or parts, shall be repaired or replaced free of charge and without charge for installation to the original purchaser.

This warranty shall not apply:

1) To normal maintenance and adjustments.

2) To any vehicle which has been repaired or altered outside of the factory in any way so that, in the manufacturer's judgment, it would affect the stability. Also it shall not apply to any vehicle which has been subject to misuse, neglect, or accident, or to any vehicle which shall operate at any speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

3) To commercial chassis and associated equipment furnished with the chassis, signaling devices, generators, batteries, or other trade accessories in which they are usually warranted separately by their respective manufacturers.

This warranty is in lieu of all other warranties, expressed or implied, all others representations to the original purchaser and all other obligations or liabilities, including liability for incidental or consequential damages on the part of the company. The manufacturer neither assumes nor authorizes any other person to give or assume any other warranty or liability on the company's behalf, unless made or assumed in writing by the company.

14) CHASSIS

The chassis shall be an International, Model 4400, supplied with the following

equipment:

15) SEATING CAPACITY
The seating capacity in the cab shall be three (3).

16) WHEELBASE
The wheelbase of the vehicle shall be no greater than 203".

17) GVW RATING
The gross vehicle weight rating shall be a minimum of 44,000 pounds.

18) FRAME
The frame rails shall be formed from 120,000 psi yield, heat treated alloy steel.

19) FRONT AXLE
Front axle shall be an "I" beam type, made of forged steel. It shall be an International, model I-140SG, with a ground rating capacity of 14,000 pounds.

20) FRONT SUSPENSION
Spring mounted: Parabolic, Taper Leaf
Capacity at ground: 14,000 pounds
Shock Absorbers: Double Acting
Shock absorbers shall be provided on the front axle.

21) REAR AXLE
The single reduction rear axle shall be a Dana Spicer, model 30105-S, with a ground rating capacity of 30,000 pounds.

22) PARKING BRAKE
The parking brake shall be spring set and located on the rear axle service brake.

23) REAR AXLE RATIO
The ratio of the rear axle shall be provided by the chassis manufacturer. The maximum top speed shall be 65 MPH

24) REAR SUSPENSION
The rear suspension shall be spring mounted, 14-leaf with a capacity at ground of 31,000 pounds. Auxiliaries shall be included and the deflection rate shall be variable.

25) AUTOMATIC CHASSIS LUBRICATION SYSTEM
A Vogel chassis lubrication system shall be provided. The lubrication shall be supplied while the vehicle is in motion to allow a uniform application of grease to the locations listed. The electronic control unit that forms part of the system shall activate the pump after an adjustable interval time. The unit shall control and monitor pump operation and report any faults via an indicator light on the driver's dashboard of the cab.

- Slack adjusters
- Brake cam screws
- Steering box
- Steering assist cylinder (if applicable)
- Tie rods
- Drag link
- King pins
- Spring pins
- Shackle pins

26) DUST SHIELDS
The front and rear brakes shall be provided with dust shields.

27) ANTI-LOCK BRAKE SYSTEM
The vehicle shall be equipped with an anti-lock braking system. The ABS shall provide anti-lock braking control on both the front and rear wheels. It is to be a digitally controlled system that utilizes microprocessor technology to control the anti-lock braking system. Each wheel is to be monitored by the system. When any particular wheel begins to lockup, a signal is to be sent to the control unit. This control unit then shall reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

28) FRONT BRAKES
The front brakes shall be S-Cam, 16.50" x 5.00".

29) REAR BRAKES
The rear brakes shall be S-Cam, 16.50” x 7.00”.

30) ENGINE EXHAUST BRAKE
A Jacobs "Extarder" engine exhaust brake shall be installed with the control located on the instrument panel within easy reach of the driver.

31) AIR COMPRESSOR, BRAKE SYSTEM
The air compressor shall be a Bendix TRU-FLO 550 with 13.2 cubic feet per minute output.
- Bendix AD-IP air dryer with heater

32) ENGINE
- Model: International DT 570E HEUI Electronic 9.3LTA
- Number of Cylinders: Six (6)

- Bore and Stroke: 4.59" x 5.75"
- Displacement: 570 cubic inches
- Compression Ratio: 17.5:1

- Rated Brake Horsepower: 330 at 2200 rpm
- Peak Torque: 950 at 1200 rpm
- Governed rpm: 2200
- Turbocharger
- Charge Air Cooled
- Combustion System: Direct injection, electronically controlled

33) ENGINE ACCESSORIES

- Fan Clutch: Kysor Series 8000 with nylon fan
- Air Cleaner: Dry type, with restriction indicator in cab
- Fuel Filters: Dual, with check valve
- Governor: Limiting speed type
- Lube Oil Cooler
- Lube Oil Filter: Full flow
- Starting Motor: 12-volt
- Oil Fill and Level Gauge
- Hand Operated, Reprime Pump

34) ENGINE WARRANTY

The engine shall come with a **five (5) year** warranty provided by the engine manufacturer.

35) ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer shall provide, at the time of bid, a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The approval of the engine installation shall be at full horsepower rating in a continuous duty application under all operating conditions, including road and pump. No type of automatic horsepower reduction feature shall be allowed.

There shall be no exception to any portion of the engine installation certification. Nonconformance shall lead to immediate rejection of bid.

36) RADIATOR

- Pressurized System, Tube, and Fin
- Deaeration Tank and Sight Glass
- Anti-Freeze Protection to -20 Degrees Fahrenheit

37) AIR INTAKE, w/EMBER SEPARATOR

The air inlet shall be equipped with a stainless steel mesh to separate water and burning embers from the air intake system such that particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.

This shall be in compliance with NFPA 1901 and 1906 standards.

38) EXHAUST SYSTEM

The exhaust system shall be 4.00" diameter.
The exhaust shall exit on the right side ahead of the rear wheels.
A heat deflector shield shall be provided where the tail pipe is routed under any side compartmentation.

The end of the exhaust pipe shall be fitted with a Plymovent flange and shall not extend past the side of the body.

39) HIGH IDLE

A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided, adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK to Engage High Idle".

40) COOLANT LINES

Premium rubber hose shall be used for all engine coolant lines installed by the chassis manufacturer.

Hose clamps shall be of a design commonly called "constant torque type" to prevent coolant leakage. They shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

41) FUEL TANK

A 50-gallon fuel tank shall be provided and mounted at the right-hand cab step. The tank shall be constructed of welded steel.

42) TRANSMISSION

An Allison, model 3000 EVS, electronic torque converting automatic transmission shall be provided.

Two (2) PTO openings shall be located on left side and top of converter housing (positions 8 o'clock and 4 o'clock).

The transmission shall be equipped with TranSynd (TES 295) fluid.
A transmission temperature gauge or warning light shall be installed on cab instrument panel.

43) TRANSMISSION SHIFT CONTROL

A "T" handle shift module shall be mounted to right of driver. Shift position indicator shall be indirectly lit for after dark operation.

The transmission shall be a 5 speed. The transmission ratio's shall be 1st - 3.49 to 1.00, 2nd - 1.86 to 1.00, 3rd - 1.41 to 1.00, 4th - 1.00 to 1.00, 5th - 0.75 to 1.00, R - 5.03 to 1.00.

44) TRANSMISSION COOLER
A transmission oil cooler shall be provided in the lower tank of the radiator.

45) TRANSMISSION WARRANTY
The transmission shall have a **five (5) year/unlimited mileage** warranty covering 100% parts and labor. The warranty to be provided by Allison Transmission and not apparatus builder.

46) DRIVELINE
Drivelines shall be a heavy duty metal tube equipped with universal joints properly sized for the application. A splined slip joint shall be provided in each driveshaft.

47) STEERING
Steering shall consist of a hydraulically driven Sheppard, model M100, steering system.

The steering wheel shall have an 18.00" diameter and also tilt feature.

48) TIRES, FRONT
Front tires shall be Goodyear 12R22.50, radial highway tread with a capacity of 14,780 pounds.

49) WHEELS, FRONT
Wheels for the front axle shall be 22.50" x 8.25" aluminum disc, ten (10)-hole pattern.

50) TIRES, REAR
Rear tires shall be four (4) Goodyear radials 315/80R22.50, G286.

51) WHEELS, REAR
The rear wheels shall be 22.50" x 9.00" aluminum disc with a ten (10)-hole pattern.

52) CAB
Type: Conventional (engine forward)
Construction: Welded Steel and Fiberglass

Accessories:
- Tinted Glass in all Windows
- Black Rubber Floor mats
- Dual Sun-Visors
- 18.00" Cab Entrance Handrails - 1.28" diameter extruded aluminum with rubber inserts one (1) each side

- Dome Light with Map Light
- Fresh Air Heater and Defroster
- Fiberglass Front End, Three (3) Piece Construction
- Hood Mounted Chrome Grille
- Composite Aero Design Halogen Headlights
- Daytime Running Lights
- Gray Vinyl Upholstery

53) CAB ACCESS STEPS
The cab steps shall be aluminum treadplate fire apparatus-type steps.

54) MIRRORS
Lang Mekra 14.84" x 7.44" mirrors, with breakaway type brackets, 102.00" wide spacing, with convex mirrors. Bright finish.

55) BUMPER
A full-width, aerodynamic, chrome steel bumper shall be attached to the front of the chassis frame. The bumper thickness shall be 0.142".

56) TOW HOOKS
Two (2) painted, forged steel tow hooks shall be provided.

57) SEATING
Seating inside the cab shall consist of an air-ride driver seat with a two (2)-man bench.

58) SEAT BELTS
All seating positions in cab and crew cab shall have seat belts.

59) ENGINE COMPARTMENT LIGHTS
Two (2) engine compartment lights shall be installed under the engine hood, of which the switches are an integral part.

60) AIR CONDITIONING
International Blend-Air with integral heater and defroster.

The system shall deliver a 12,000 BTU/hour in the air conditioning mode when tested per SAE J1484 with inlet air conditions of 80 degrees F. dry bulb and 67 degrees F. wet bulb.

Includes Hydro fluorocarbon HFC-134A refrigerant.

61) CAB INSTRUMENTS
- Engine Temperature Gauge and Warning Buzzer
- Engine Oil Pressure Gauge and Warning Buzzer
- Speedometer with Odometer
- Engine Tachometer
- Engine Hour meter

- Fuel Level Gauge
- Voltmeter: Low voltage red warning light and audible alarm
- Air Brake Pressure Gauge
- Air Restriction Indicator
- Circuit Breakers: For overload protection of electric circuits
- Ignition Switch: Keyless type
- Windshield Wiper Control with intermittent feature
- Windshield Washer Controls

62) EMERGENCY SWITCH PANEL

An emergency switch panel shall be provided in the cab.

63) BATTERY SYSTEM

A single starting battery system shall be provided consisting of three (3)-12 volt, 650 CCA, maintenance-free, group 31 batteries.

The batteries system shall have a total of 1950 CCA with a minimum reserve capacity of 540 minutes.

64) MASTER BATTERY SWITCH

A master battery switch, to activate the battery system, shall be provided inside the cab within easy reach of the driver.

The master battery disconnect switch shall be wired between the starter solenoid and the remainder of the electrical loads on the apparatus.

A green "battery on" indicator light, visible from the driver's position shall be provided.

65) BATTERY CHARGER/AIR COMPRESSOR

A Kussmaul combination battery charger/air compressor system shall be provided. Battery charger output shall be 25 amps and air compressor capacity shall be .35 scfm at 60 psi.

The battery charger/air compressor shall be wired to the 120 volt shoreline to activate automatically when power is connected.

The charger shall be provided with a battery indicator. Indicator shall be located near the shore line connection.

66) AUTO-EJECT RECEPTACLE

For the battery charger/air compressor, one (1) receptacle shall be provided. The receptacle shall be the Kussmaul auto-eject 20 WP and shall be installed on the left pump panel.

The auto-eject shall be connected to the vehicle start buttons; so, when the engine is

started the auto-eject drives the shoreline connection from the inlet. The electrical inlet shall include a red spring-loaded cover to prevent water from entering the receptacle when the shoreline is not connected.

The electrical receptacle shall be a 120 volt, 20 amp (NEMA 5-20P) and be wired to the battery charger with no less than 12 gauge wire properly supported and shielded from injury.

67) ELECTRICAL SYSTEM

Alternator: Leece-Neville internally regulated, with a capacity of 12-volt 270 amperes.

The alternator shall be provided with a 2.40" diameter pulley.

The pulley shall increase alternator output at engine idle, allowing the apparatus to meet or exceed current N. F. P. A. 1901 testing.

68) AMP DRAW REPORT

The bidder shall provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus shall provide the following:

1) Documentation of the electrical system performance tests.

2) A written load analysis, which shall include the following:

A) The nameplate rating of the alternator.

B) The alternator rating under the conditions specified per:
- NFPA 1901, 1999 Edition, section 11-3.2.

C) The minimum continuous load of each component that is specified per:
- NFPA 1901, 1999 Edition, section 11-3.2.

D) Additional loads that, when added to the minimum continuous load, determine the total connected load.

E) Each individual intermittent load.

All of the above listed items shall be provided by the bidder per NFPA 1901, 1999 Edition, section 11-15.

69) EXTERIOR LIGHTING

Exterior lighting shall meet or exceed Federal Department of Transportation, Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at time of proposal.

Front headlights shall be halogen type and comply with all FMVSS requirements.

Five (5) LED clearance and marker lights shall be installed across the leading edge of the cab.

70) FRONT WARNING LIGHTS

A pair of Code 3®, Model OL135, 35 watt OsciLaser warning lights with clear lenses shall be located on the front grille. A switch shall be provided inside the cab on the switch panel for actuation. Lights shall operate in "Clearing right of way" mode only.

A pair of Code 3, Model 65BZR LED warning lights with red lenses shall be located below the OsciLasers on the front grille. A switch shall be provided inside the cab on the switch panel for actuation. Lights shall operate in "Clearing right of way" and "Blocking right of way" mode.

71) BACK-UP ALARM

An ECCO, Model SA917-PM2, solid state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum five (5) dba above surrounding environmental noise levels.

72) MANUAL, BODY PARTS ONLY

Two (2) custom parts manuals for the factory installed parts only shall be provided in hard copy with the completed unit.

The manual shall contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in Alphabetical order
- Instructions on how to locate parts

The manual shall be specifically written for the body model being purchased. It shall not be a generic manual for a multitude of different bodies.

73) SERVICE PARTS INTERNET SITE

The service parts information included in this manual are also available on the factory website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

74) MANUALS, SERVICE

Two (2) service manual supplements containing parts and service information on factory installed components shall be provided with the completed unit.

The manual shall be specifically written for the unit being purchased. It shall not be a generic manual for a multitude of different units.

75) MANUAL, CHASSIS OPERATION

One (1) chassis operation (manufacturer's standard) shall be provided with the completed unit.

76) ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, shall be provided.

77) WATER TANK

The tank shall have a minimum capacity of 2000 U.S. gallons complete with a **lifetime** warranty. The tank shall be of a specified configuration, and so designed to be completely independent of the compartment and/or fender modules. When placed on the chassis, the tank shall meet or exceed all federal DOT regulations regarding weight distribution, axle loading, and horizontal and vertical center of gravity locations. The tank manufacturer shall mark the tank with the manufacturer's name, date of manufacture, and serial number. The tank manufacturer shall furnish notice that indicates proof of warranty.

The tank shall be constructed using a virgin polypropylene sheet with a minimum thickness of .50". This material shall be a high impact copolymer (HIC), non-corrosive, stress relieved thermoplastic, and UV stabilized for maximum protection.

All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. All swash partitions shall interlock and be welded to each other as well as to the walls of the tank.

The tank shall incorporate a manual fill tower with a 6.00" combination vent/overflow pipe. The fill tower shall be constructed of polypropylene and shall be large enough to provide filling by means of a conventional 2.50" hose nozzle. The tower shall be located near the center of the tank to minimize water surge during vehicle operation. The tower shall have a removable polypropylene screen and a polypropylene hinged cover. The vent/overflow pipe shall run through the tank and exit through the floor of the tank behind the rear axle.

The sides of the tank shall be covered with smooth sheets of aluminum that are painted to match the body. These sheets shall provide a pleasing, finished, traditional "fire truck" appearance. These side sheets shall not comprise any part of the body or its structure. To closely match the expansion / contraction of the water tank, these sheets

shall always be aluminum, regardless of the material used to construct the body compartments.

The tank, side sheets and hose bed (if provided) shall be removable as a unit and shall be a separate component from the body compartmentation.

78) TOP OF TANK, ACCESS LADDER

An access ladder constructed of aluminum tubing shall be provided for access to the hose bed and/or tank dome. The ladder shall have a flexible mount attached to the tailboard. The ladder shall be located on the driver's of the truck at the rear.

79) TANK OVERFLOW/VENT

A 6.00" tube shall be installed through the shell of the tank. This tube shall function as an overflow to discharge water to the ground once the tank is filled to capacity. It shall also function as a vent to allow air to enter the tank when water is being dumped or pumped from the tank.

The tube shall be positioned to drain at the bottom of the truck near the center, behind the rear axle.

80) REAR TANK FILLS

Two (2) 2.50" gated external tank fills shall be installed and properly labeled at the rear of the water tank, located one on each side.

Piping, for the fills, shall be routed through the rear wall of the tank and include a flow deflector to break up the stream of water entering the water tank.

A 2.50" full flow ball valve with 2.50" piping and a 2.50" (F) NST chrome swivel shall be located at each inlet.

A 2.50" chrome plated 30 degree elbow and plug shall be provided for each tank fill.

81) REAR TANK DUMP VALVE

One (1) 10.00" Newton Quick Dump shall be installed at the rear of the tank. The valve shall be operated manually by a lever control located on top of the valve.

A 90 degree, one (1) piece aluminum dump chute shall be provided. The chute shall be reversible to dump from both side's and removable for storage. The chute shall extend past the body side for dumping.

A chute support system shall also be provided. It shall be constructed of 2.00" X 2.00" aluminum tubing. Two (2) "receiver style" mounts shall be installed under the tailboard to allow the support system to be used for dumping to either side of the truck. The support shall store under the tailboard. A locking pin shall be provided.

82) HOSE BED

The hose bed shall be fabricated of .190"-5052 aluminum with a 38,000 psi tensile strength.

Hose body width shall be a minimum of 78.00" inside.

Upper edges of side panels shall have a double break for rigidity, a split tube finish shall not be acceptable.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats shall be a minimum of .50" x 4.50" with spacing between slats for hose ventilation.

83) RUNNING BOARDS

Running boards shall be fabricated of .125" bright aluminum treadplate.

Each running board shall be supported by a welded 2.00" square tubing and channel assembly, which shall be bolted to the pump compartment substructure.

Running boards shall be 12.75" deep and spaced .50" away from the pump panel.

A splash guard shall be provided above the running board treadplate.

84) HOSE TRAY

A hose tray with a capacity of 50.00’ of 3.00” hose shall be provided in the driver’s side running board.

85) TAILBOARD

The tailboard shall be constructed of .125" bright aluminum treadplate supported by a structural steel assembly.

The rear tailboard shall be 16.00" deep.

The exterior side shall be flanged down and in. The flanges shall not be notched.

86) TOW EYES

Two (2) rear painted "tow" eyes shall be located at the rear of the apparatus and shall be mounted directly to the chassis frame rails. The inner and outer edges of the tow eyes shall be radiused.

87) COMPARTMENTATION

Body and compartments shall be fabricated of .125", 5052-H32 aluminum with a tensile strength range of 31,000 to 38,000 psi.

Side compartments shall be an integral assembly with the rear fenders.

Circular fender liners shall be provided for prevention of rust pockets and ease of maintenance.

Compartment flooring shall be of the sweep out design with the floor higher than the compartment door lip.

The compartment door opening shall be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

Drip protection shall be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

Front facing compartment walls shall be covered with bright aluminum treadplate.

All screws and bolts which protrude into a compartment shall have acorn nuts on the ends to prevent injury.

88) UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load shall be provided.

The backbone of the support system shall be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.

The support system shall include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts.

Attached to the bottom of the steel vertical angles shall be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.

The body substructure shall result in a 500 pound equipment support rating per lower compartment.

A design with body compartments hanging on the chassis in an unsupported fashion shall not be acceptable.

89) AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of NFPA section 13-7.3.

90) LOUVERS

All body compartments shall have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers shall be formed into the metal and not added to the compartment as a separate plate.

91) TESTING OF BODY DESIGN

Body structural analysis shall be fully tested. Proven engineering and test techniques such as finite element analysis, stress coating and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the cab, body and substructure.

Body shall be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure shall include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle at 35 mph on a "washboard" road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of actual testing techniques shall be made available upon request.

92) BODY WARRANTY

A copy of the fire apparatus manufacturer's warranty shall be included with the bid. The warranty shall state that the body shall be free of structural failures caused by defective design or workmanship for a warranty period of **ten (10) years** from the date the new vehicle is first delivered **or 100,000 miles,** whichever occurs first and that defective parts, under the warranty, shall be repaired or replaced without charge to the original purchaser.

93) COMPARTMENTATION, DRIVER'S SIDE

One (1) roll-up door compartment shall be provided in the area ahead of the rear wheels. The interior dimensions of the compartment shall be 63.00" wide x 22.13" high x 25.88" deep. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of the compartment shall be 57.25" wide x 21.88" high. Closing the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

94) COMPARTMENTATION, PASSENGER'S SIDE

One (1) roll-up door compartment shall be provided in the area ahead of the rear wheels. The interior dimensions of the compartment shall be 63.00" wide x 22.13" high x 25.88"

deep. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of the compartment shall be 57.25" wide x 21.88" high. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

95) ROLL-UP DOOR, SIDE COMPARTMENTS

All roll-up door(s) shall be painted job color, double faced, aluminum construction and manufactured by A&A Manufacturing (Gortite).

Lath sections shall be an interlocking rib design and shall be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals shall allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals shall be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces shall be nylon 66. All nylon components shall withstand temperatures from plus 300 to minus 40 degrees Fahrenheit. Hardened plastic shall not be acceptable.

A polished stainless steel lift bar shall be provided for opening door. Lift bar shall be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge shall be supplied over lift bar for additional area to aid in closing the door.

Door(s) shall be constructed from an aluminum box section. The exterior surface of each slat shall be flat. The interior surfaces shall be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartment(s), the spring roller assembly shall not exceed 3.00" in diameter. A roll-up door that retracts below the compartment ceiling (garage door style) shall not acceptable.

The header for the roll-up door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of "open compartment door" warning lights.

All mechanical components of the door shall be warranted to be free from defects in materials and workmanship for the lifetime of the vehicle. All parts covered under this warranty shall be to the original owner.

96) COMPARTMENT PARTITIONS AND SHELVES

Each compartment shall be provided with one (1) vertical partition and one (1) adjustable shelf. Shelves shall be constructed of aluminum with 2.00" flanges on all sides. Exact location of partitions shall be determined at preconstruction conference.

97) COMPARTMENT GRATING

Each compartment shall be provided with aluminum grating on the floor.

98) RUB RAIL

Bottom edge of the side compartments shall be trimmed with a bright aluminum extruded rub rail.

Trim shall be 2.12" high with 1.38" flanges turned outward for rigidity.

The rub rails shall not be an integral part of the body construction, which allows replacement in the event of damage.

99) BODY FENDER CROWNS

Stainless steel fender crowns shall be provided around the rear wheel openings.

A rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

100) HANDRAILS

The handrails shall be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.

Drain holes shall be provided in the bottom of all vertically mounted handrails.

- Two (2) handrails shall be provided - one above each side pump panel.

101) STEPS

A step shall be provided on the front of each fender compartment. The front step shall be a bright finished folding type.

102) FOLDING TANK RACK

A manually-operated, drop-down folding tank rack shall be provided on the left side of the body above the side compartment. The rack shall have the capacity to hold one (1) 2,000 gallon folding tank.

103) HARD SUCTION TRAYS

Three (3) painted aluminum trays for 6.00" hard suction hose shall be provided on the right side of the body above the side compartment. Trays shall be for 10' lengths of hose. Chrome, spring-loaded hold-down handles shall be provided.

104) MIDSHIP FIRE PUMP

Midship fire pump shall be a Waterous CLVK-500, 500 gpm, single (1) stage, midship mounted, centrifugal type.

Pump shall deliver the percentage of rated discharges at the pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure.
- 100% of rated capacity at 165 psi net pump pressure.
- 70% of rated capacity at 200 psi net pump pressure.
- 50% of rated capacity at 250 psi net pump pressure.

Entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (34.5 bar).

Pump shall be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the latest NFPA pamphlet #1901, and shall be free from objectionable pulsation and vibration.

Pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (2041.2 bar).

All moving parts in contact with water shall be of high quality bronze or stainless steel.

Pump impeller shall be hard, fine grain bronze of the mixed flow design, accurately machined, hand-ground, and individually balanced. The vanes of the impeller's intake eyes shall be hand-ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Pump shaft shall be electric furnace, heat-treated, corrosion resistant stainless steel, to be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft must be sealed with double oil seal to keep road dirt and water out of drive unit.

Pump shall be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

The mechanical seal shall consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring shall press against a highly polished stainless steel stationary ring that is sealed within the pump body.

In addition, a throttling ring shall be pressed into the steel chamber cover, providing a

very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance shall not deteriorate, nor shall the pump lose prime, while drafting if the seal fails during pump operation.

Wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

105) PUMP TRANSMISSION

Medium-duty "K" series transmission with two (2) helical gears and a 1.125" diameter keyed shaft shall be provided.

The water pump shall be driven by a hot shift PTO located on the chassis transmission.

An interlock system shall be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. Interlock system shall be designed to allow stationary pumping only.

106) PUMP SHIFT

A pump shift will be provided within easy reach of the driver for engagement of the PTO driven pump. The shift will include the indicator lights as mandated by NFPA.

107) AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. Heat exchanger shall be cylindrical type and shall be a separate unit. It shall be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger shall be plumbed to the master drain valve. Engine water lines shall be run inside plastic conduit.

108) INTAKE RELIEF VALVE

An Elkhart relief valve shall be installed on the suction side of the pump preset at 125 psig.

Relief valve shall have a working range of 75 psig to 250 psig.

Outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

Control shall be located behind an access door at the right (passenger's) side pump panel.

109) PRESSURE GOVERNOR

A Class1 "Captain" pressure sensing governor (PSG) system shall be provided. The PSG system shall eliminate the need for a discharge pressure relief valve.

The pressure governor system shall be connected directly to the engine mounted Electronic Control Module (ECM) or may be an integral part of the engine ECM. A pressure transducer shall be installed in the water discharge manifold on the pump. The transducer continuously monitors pump pressure sending a signal to the pressure governor. The pressure governor then sends a signal to the engine ECM, which modulates fueling in order to maintain a set pressure or engine speed (within engine/pump operating capabilities). There shall be no user serviceable items or maintenance required on the PSG system. The PSG system shall not require a mechanical drive, oil, or air supply for a means of control.

The pressure sensor governor system shall be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

The pressure sensor governor system shall have two (2) modes of operation: pressure mode or rpm mode.

When in the pressure mode, the PSG system shall automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

In the rpm mode, the PSG system shall automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

A pump cavitation protection feature shall be provided which shall return the engine to idle should the pump cavitate.

A VHS videotape describing the operation, of the pressure governor, and troubleshooting procedures shall also be provided with the apparatus.

110) <u>ESP PRIMING PUMP</u>

Priming pump shall be a positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

One (1) priming control shall open the priming valve and start the priming motor.

Primer shall be environmentally safe and self lubricating.

111) <u>PUMP WARRANTY</u>

A Waterous **two (2) year** warranty shall be provided for the pump.

112) <u>PUMP MANUALS</u>

Two (2) pump manuals from the pump manufacturer shall be furnished in compact disc format with the apparatus. Manuals shall cover pump operation, maintenance,

and parts.

113) PLUMBING

All inlet and outlet plumbing, 3.00" and smaller, shall be plumbed with either stainless steel pipe or synthetic rubber hose reinforced with hi-tensile polyester braid. Small diameter secondary plumbing such as drain lines shall be stainless steel, brass or hose.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with victaulic or rubber couplings.

Plumbing manifold bodies shall be ductile cast iron or stainless steel.

All lines to drain through either a master drain valve or shall be equipped with individual drain valves. All individual drain lines for discharges shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

114) PUMP PLUMBING WARRANTY

The stainless steel plumbing components and ancillary brass fittings used in the construction of the water/foam plumbing system shall be warranted for a period of **ten (10) years or 100,000 miles**. This covers structural failures caused by defective design or workmanship, or perforation caused by corrosion, provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original purchaser for a period of ten years from the date of delivery. A copy of the warranty shall be submitted with the bid. (No exceptions)

115) MAIN PUMP INLETS

A 4.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

The main pump inlets shall have 6.00” National Standard Threads with a long handle chrome cap

The cap shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

116) SHORT SUCTION TUBE

The suction tubes on the midship pump shall have "short" suction tubes to allow for installation of adapters without excessive overhang.

117) VALVES

All ball valves shall be Akron Brass in-line valves. The Akron valves shall be the

8000 series heavy-duty style with a nickel-chrome plated brass ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

118) INLET (Left side)
On the left side pump panel shall be one (1) - 2.50" auxiliary suction, terminating in 2.50" National Standard Hose Thread. The auxiliary suction shall be provided with a strainer, chrome swivel and plug.

Inlet valve location shall be outside of the pump panel.

119) INLET CONTROL
Control for the side auxiliary inlet(s) shall be located at the inlet valve.

120) INLET BLEEDER VALVE
A .75" ball type bleeder valve shall be provided for each side gated inlet. The valves shall be located behind the panel with a hand wheel type knob for the control extended to the outside of the panel. The water that is discharged by the valve shall be routed below the chassis frame rails.

121) TANK TO PUMP
The booster tank shall be connected to the intake side of the pump with heavy duty 4.00" piping and a quarter turn 3.00" valve with the control remotely located at the operator's panel. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

122) TANK REFILL
A 2.00" combination tank refill and pump bypass line shall be provided using a quarter-turn full flow ball valve, controlled from the pump operator's panel.

123) DISCHARGE OUTLETS (Left Side)
There shall be one (1) discharge outlet with a 2.50" valve on the left side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter.

124) DISCHARGE OUTLETS (Right Side)
There shall be one (1) discharge outlet 2.50" valve on the right side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter.

125) DISCHARGE CAPS
Chrome plated, rocker lug, caps with chains shall be furnished for all side discharge outlets.

The caps shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO

EXCEPTIONS)

126) OUTLET BLEEDERS

A .75", quarter turn type, bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves shall be located behind the panel with a hand wheel type control extended to the outside of the side pump panel. Bleeders shall be located in a horizontal line at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders shall be routed below the chassis frame rails.

127) ELBOWS, LEFT SIDE OUTLETS

The 2.50" discharge outlets, located on the left side pump panel, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

128) ELBOWS, RIGHT SIDE OUTLETS

The 2.50" discharge outlets, located on the right side pump panel, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected.

129) DISCHARGE OUTLET CONTROLS

The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve.

If a hand wheel control valve is used, the control shall be a minimum of a 3.9" diameter chrome plated hand wheel with a dial position indicator built in to the center of the hand wheel.

130) CROSSLAY HOSE BEDS

Two crosslays with 1.50" outlets shall be provided. Each bed to be capable of carrying 200 feet of 1.75" double jacketed hose and shall be plumbed with 2.00" i.d. pipe and gated with a 2.00" quarter turn ball valve.

Outlets to be equipped with a 1.50" National Standard hose thread 90 degree swivel

located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay controls shall be at the pump operator's panel.

Color-code on name tags shall be yellow for front crosslay and orange for rear crosslay.

The center crosslay dividers shall be fabricated of .25" aluminum and shall provide adjustment from side to side. The divider shall be unpainted with a DA finish. The remainder of the crosslay bed shall be painted job color.

Vertical scuffplates, constructed of stainless steel, shall be provided at the front and rear ends of the bed on each side of vehicle.

Crosslay bed flooring shall consist of removable perforated brushed aluminum.

131) PUMP COMPARTMENT

The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment shall be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis in a single assembly.

132) PUMP MOUNTING

Pump shall be mounted to a substructure which shall be mounted to the chassis frame rail using rubber isolators. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump.

133) PUMP CONTROL PANELS (Side Control)

All pump controls and gauges shall be located at the left (driver's) side of the apparatus and properly marked.

The pump panel on the right (passenger's) side shall be removable with lift and turn type fasteners. The left (driver's) side shall be fastened with screws.

The control panels shall be 34.00" wide.

The gauge and control panels shall be two (2) separate panels for ease of maintenance.

The side gauge panel shall be hinged at the bottom with a full length stainless steel

hinge. The fasteners used to hold the panel in the upright position shall be quarter-turn type. Vinyl covered cable or chains shall be used to hold the gauge panel in the dropped position.

Polished stainless steel trim collars shall be installed around all inlets and outlets.

All push/pull valve controls shall have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods shall be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls shall be capable of locking in any position. The control rods shall pull straight out of the panel and shall be equipped with universal joints to eliminate binding.

Identification tags for the discharge controls shall be located directly above the control handle and recessed within the same casting as the guide.

All line pressure gauges shall be mounted in individual chrome plated castings with the identification tag recessed in the casting below the gauge. All remaining identification tags shall be mounted on the pump panel in chrome plated bezels. Mounting of the castings and identification bezels shall be done with a threaded peg cast on the back side of the bezel or screws.

134) PUMP PANEL CONFIGURATION

The pump panel configuration shall be neat and orderly.

135) PUMP AND GAUGE PANEL

The pump and gauge panels shall be constructed of brushed stainless steel.

A polished aluminum trim molding shall be provided on both sides of the pump panel.

The passenger's side pump panel shall be removable and fastened with swell type fasteners.

136) PUMP PANEL GAUGES AND CONTROLS

The following shall be provided on the pump and gauge panels in a neat and orderly fashion:

- Engine Oil Pressure Gauge: With visual and audible warning
- Engine Water Temperature Gauge: With visual and audible warning
- Tachometer: Electric
- Master Pump Drain Control
- Voltmeter
- Check Transmission Warning Indicator Light
- Stop Engine Warning Indicator Light
- Check Engine Warning Indicator Light.

137) MASTER GAUGES, VACUUM and PRESSURE

The pump master vacuum and pressure gauge shall be Class 1 fluid filled. The fluid fill shall be an environmentally friendly synthetic anti-freeze agent, acting as a lubricant and shock absorber.

The gauge accuracy shall comply with ANSI B40.1 Grade A requirements.

Temperature range shall be from -40 degrees F to +160 degrees F.

Gauges shall be a minimum 100mm (4" nom.) in diameter and shall be a compound style gauge with a vacuum/pressure range of 30"- 0 - 600 psi.

Gauges shall have white faces with black markings.

The individual pressure gauge shall be installed as close to the outlet control as practical.

Test port connections shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and polished stainless steel plugs. They shall be marked with a label.

138) PRESSURE GAUGES

The individual "line" pressure gauges for the discharges shall be Class 1 fluid filled. The fluid fill shall be an environmentally friendly synthetic anti-freeze agent, acting as a lubricant and shock absorber.

The gauge accuracy shall comply with ANSI B40.1 Grade A requirements.

Temperature range shall be from -40 degrees F to +160 degrees F.

Gauges shall be a minimum 63mm (2.5" nom.) in diameter and shall be a compound style gauge with a vacuum/pressure range of 30"- 0 - 400 psi.

Gauges shall have white faces with black lettering.

The individual pressure gauge shall be installed as close to the outlet control as practical.

The pressure gauges shall come with a **seven (7) year** warranty on accuracy, performance, liquid leakage, discoloration, defects, and workmanship provided by Innovative Controls, Inc.

139) WATER LEVEL GAUGE

An electronic water level gauge shall be provided on the operator's panel that registers water level by means of five colored LED lights. The lights shall be durable, ultra-

bright five LED design viewable through 180 degrees. The water level indicators shall be as follows:

- 100% = Green
- 75% = Yellow
- 50% = Yellow
- 25% = Yellow
- Refill = Red

The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the water tank is empty.

The level measurement shall be based on the sensing of head pressure of the fluid in the tank.

The display shall be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design shall provide complete protection from water and environmental elements. An industrial pressure transducer shall be mounted to the outside of the tank. The field calibratable display measures head pressure to accurately show the tank level.

140) LIGHT SHIELD

Illumination shall be provided for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination shall be a minimum of 5 foot-candles on the face of the device. Internal illumination shall be a minimum of 4 foot-lambert.

Lights shall be installed under a stainless steel shield. One pump panel light shall come on at the operator's panel when the pump is shifted into gear from inside the cab. This is to afford the operator some illumination when first approaching the control panel. The remaining lights to be actuated from a switch located on the pump panel.

141) ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature crosslink type. Wiring shall be run in loom or conduit where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Electrical wiring and equipment shall be installed utilizing the following guidelines:

(A) All holes made in the roof shall be caulked with silicon. Rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.

(B) Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.

(C) Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

(D) Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).

(E) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

(F) All electrical terminals in exposed areas shall have silicon (1890) applied completely over the metal portion of the terminal. All emergency light switches shall be mounted on a separate panel installed in the cab. A master warning light switch and individual switches to be provided to allow preselection of emergency lights. The light switches shall be "rocker" type with an internal indicator light to show when switch is energized. All switches shall be properly identified and mounted in a removable panel for ease in servicing. Identification of the switches shall be done by either printing or etching on the switch panel. The switches and identification shall be illuminated.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, shall be furnished. All marker, clearance, and tail lights shall be LED. Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests shall be recorded and provided to the purchaser at time of delivery.

142) <u>STEP LIGHTS</u>

Four (4) Weldon, Model 9186-23882-30, step lights shall be provided.

One (1) step light shall be provided on each side, on the front compartment face.

Two (2) step lights at rear shall illuminate the tailboard.

These step lights shall be actuated with the pump panel light switch.

143) REAR FMVSS LIGHTING

A pair of Weldon, three (3) lamp modules shall be provided. Each module shall include a stop-tail light, directional light and backup light mounted in a polished aluminum housing.

The stop, tail, directional, identification, and clearance lights shall be LED.

The lights shall be mounted on the face of the rear body compartments.

Four (4) red reflectors shall be provided.

A Weldon, Model 23882-2600-00 license plate bracket shall be mounted on the driver's side above the warning lights. A Weldon, Model 9186-23882-30, step lamp shall illuminate the license plate.

The three (3) identification lights located at the rear shall be installed per the following:

As close as practical to the vertical Centerline.
Centers spaced not less than six (6) inches or more than twelve (12) inches apart.
Red in color.
All at the same height.

The outside clearance lights located at the rear shall be installed per the following:

To indicate the overall width of the vehicle.
At least one (1) each side of the vertical Centerline.
All at the same height.
As near the top as practical.
To be visible from the rear and the side.

Per FMVSS 108 and CMVSS 108 requirements.

144) "DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light (located in the driving compartment) shall be illuminated automatically per NFPA (1996 edition, 9-11 or 1999 edition 11-11). The light shall be labeled "Do Not Move Apparatus If Light Is On".

145) OPEN DOOR INDICATOR LIGHT

A red "open door" indicator light shall be provided inside the cab, in clear view of the driver, to warn of an open compartment door.

146) COMPARTMENT LIGHTING

6.00" diameter Truck-Lite, model 79384, light/s shall be provided in each enclosed compartment. Each light shall have a number 1076 one filament, two wire bulb.

Opening the compartment door shall automatically turn compartment lighting on.

147) PUMP COMPARTMENT LIGHT

A compartment light shall be provided inside the pump enclosure.

148) PERIMETER SCENE LIGHTS, CAB

There shall be a Truck-Lite, model 40003, 4.00" grommet mount weatherproof light provided for each cab door. Lighting shall be designed to provide illumination on areas under the driver and officer riding area exits, which shall be activated automatically when the exit doors are opened and by the same means as the body perimeter lights.

The lighting shall be capable of providing illumination at a minimum level of one (1) foot-candle on ground areas within 30.00" of the edge of the apparatus in areas which personnel climb in or out of the apparatus or descend from the apparatus to the ground level.

149) PERIMETER SCENE LIGHTS, BODY

There shall be a total of four (4) Truck-Lite, model 40003, 4.00" grommet mount weatherproof lights provided on the apparatus. Two (2) lights shall be provided under the rear step area and two (2) lights shall be provided under the pump panel running boards. The lights shall be spaced one (1) each side of apparatus and have a clear lens. The perimeter scene lights shall be activated by a parking brake.

The lighting shall be capable of providing illumination at a minimum level of one (1) foot-candle on ground areas within 30.00" of the edge of the apparatus in areas designed for personnel to climb onto the apparatus or descend from the apparatus to the ground level.

150) REAR SCENE LIGHTS

Two (2) Weldon 2010 scene lights shall be mounted on the rear of the body to illuminate tank dump operations. These light shall be controlled by a dash mounted switch, a rear mounted switch, and by placing the transmission in reverse.

151) DECK LIGHTS

Two (2)-6.00" Unity AG deck lights with swivel mount shall be provided at the rear of the hose bed, one (1) each side.

One (1) light shall be furnished with a 160,000 candle power halogen spot bulb and the other shall be furnished with a 6,000 candle power halogen flood bulb.

152) AIR HORN

One (1) 24" Grover 1510 adjustable Emergency Vehicle Air Horn shall be provided and located on the passenger side frame rail behind the front bumper.

The horn shall be piped to the air brake system wet tank utilizing .38" tubing. A pressure protection valve shall be installed in-line to prevent the loss of air in the air brake system.

The air horn shall be actuated by one (1) "clamshell" foot switch, located on the officer's side and steering wheel button. An air/electric horn selector switch shall be provided for the driver on the switch panel.

153) MECHANICAL SIREN

A Federal Q2B mechanical siren shall be installed in the center of the front bumper.

Siren shall be actuated by a foot switches on each side of the floor.

The siren brake shall be actuated by a momentary switch on the switch panel.

154) WARNING LIGHT (Cab Roof)

A Code 3®, XL, Model 556A3, lightbar shall be mounted on the cab roof.

The length of the lightbar shall be 56.00".

The lightbar shall consist of the following:

Two (2) 50 watt standard rotators with red filters.
Two (2) 50 watt standard rotators with red filters.
One (1) 50 watt fast rotator.
Two (2) two-step cascade mirrors.
Two (2) diamond mirrors.

To meet the NFPA requirements the center rotator shall be load managed when the parking brake is set.

An Opticom Priority Control System infrared emitter Model 792-H shall be installed in the light bar. Switch shall be dash-mounted. Traffic preemption device shall be load managed to operate only when emergency lights are activated and parking brake is released.

The light bar shall be furnished with all clear lenses.

155) SIDE ZONE LOWER LIGHTING

One pair of flush mounted Code 3®, Model LXEX1F-R flashing LED lights shall be provided. The color of the lights shall be red.

The lights shall be located on the cab fender forward of the front axle center line.

A pair of Code 3®, Model 65BZR LED lights shall also be provided. One light shall be provided on each side of the truck body. The color of these lights shall be red.

A switch shall be supplied in the cab instrument panel to activate lights.

156) REAR ZONE LOWER LIGHTING

Two (2) Code 3®, Model 65BZR, red LED lights shall be located at the rear of the apparatus and shall be required to meet the lower level optical warning and optical power requirements of NFPA.

The lights shall be controlled by a lighted switch on the cab instrument panel.

157) WARNING LIGHTS (Rear of Hose Bed)

Two (2) Code 3®, Model 550, rotating beacons shall be provided at the rear of the truck, located one (1) each side.

Each beacon shall contain a 50 watt fast rotator.

The color shall be driver side dome red and pass side dome amber.

The rear warning lights shall be mounted on stainless steel brackets with all wiring totally enclosed. These brackets shall also support the clearance/marker lights.

158) TRAFFIC DIRECTING LIGHT

A Whelen TA 870-A traffic directing light shall be flush-mounted in the rear of the body below the hose bed.

A control head shall be used to actuate the light. This control head shall be located in the cab and be easily accessible to the driver.

The control head shall simulate the action of the lights at the rear of the vehicle.

The light shall be capable of four patterns: Arrow right, arrow left, center out, and alternating flash.

159) 800 MHz MOBILE RADIO

One (1) M/A-Com Jaguar 725M 800MHz radio with dual control heads shall be furnished.

All cables, speakers, microphones, antennae, and other necessary radio equipment shall be furnished.

160) COMPUTER

One (1) Panasonic Toughbook 28 with Windows XP provision for computer to receive continuous power shall be provided. Computer shall have the following:

Pentium 2 GHz or higher
512 RAM
40GB hard drive or higher
Three (3) year parts and labor warranty
CD-RW
Backlit keyboard
Vehicle port replicator
Auto/air adapter
Xircom combo card
Integrated 802.11g wireless networking card
Gambler Johnson Notepad III mounting bracket with light

161) LOOSE EQUIPMENT

The following equipment shall be furnished with the completed unit:

One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit

162) PAINT

The exterior custom body painting finishing process as follows:

Manual Surface Preparation - All exposed metal surfaces on the custom body shall be thoroughly cleaned and prepared for painting. Surfaces that shall not be painted include all chrome plated, stainless steel, anodized aluminum and bright aluminum treadplate. Each imperfection on the exterior metal surface shall be removed or filled and then sanded smooth for a smooth appearance. All seams shall be sealed before painting.

Chemical Cleaning and Treatment - The metal surfaces shall be properly cleaned using an acid etching system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well. An ultra pure water final rinse shall be applied to all metal surfaces, excluding undercarriage components, at the conclusion of the metal treatment process.

Sealer Primer Coat - A two (2) component sealer primer coat shall be applied.

Topcoat Paint - Two (2) coats of an automotive grade, two (2) component acrylic urethane paint, shall also be applied.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure paint behind all mounted items. Body assemblies that can not be finish painted after assembly shall be finish painted before assembly.

The chassis shall be painted by the chassis manufacturer, and shall remain the commercial grade finish as provided. To ensure a good color match between the body and chassis, the apparatus manufacturer and chassis manufacturer shall have a mutually preapproved paint color program.

Prior to reassembly and reinstallation of lights, handrails, door hardware and any miscellaneous body items, an isolation tape or gasket material must be used to prevent damage to the finish painted surfaces (no exceptions). A nylon washer shall be installed under each acorn nut or metal screw that is fastened directly to a painted body surface.

The cab roof, pillars, and top of hood shall be painted PPG FTB91795 Polar White. The balance of the cab and entire body shall be painted PPG FTB75381 Red.

163) PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly shall remain the color and paint quality as received from the chassis manufacturer. The frame and components shall not be repainted.

Components that are considered part of the "frame assembly" are frame rails, cross members, axles, suspension, steering gear and the fuel tank.

164) WARRANTY - PAINT AND CORROSION

The body exterior paint finish shall be warranted against blistering, peeling, corrosion, lack of adhesion or any other manufacturing or material defect for a period of ten **(10) years**.

The body shall also be warranted against corrosion perforation for a period of **ten (10) years**.

A copy of the manufacturer's warranty shall be included with the bid.

165) PAINT, COMPARTMENT INTERIOR

Interior of compartmentation shall be painted with gray spatter type paint.

166) REFLECTIVE BAND

A 6.00" gold reflective band shall be provided along the sides and rear of the body. A 2.00” white reflective band shall be spaced 1.00” below the gold. A 4.00" white

reflective band shall be provided at the front of the apparatus.

The reflective band provided on the cab face shall be between the front grille and the front bumper.

167) DOOR DECALS

Department furnished decals shall be applied to the cab doors.

168) LETTERING

LYNCHBURG FIRE & EMS in 5.00" gold reflective lettering with black shade shall be applied to both sides of the body above the folding tank and hose trays.

TANKER 1 in 3.00" gold reflective lettering with black shade shall be applied to both front fenders.

A 12.00" Helvetica bold numeral "1" in white reflective material shall be applied to the compartment door on each side.

An 8.00" Helvetica bold numeral "1" in ruby red reflective material shall be applied to the driver's side of the front bumper.

A 12.00" Helvetica bold numeral "1" in ruby red reflective material shall be applied to the rear face of the body.

169) REFLECTIVE STRIPE, CAB DOORS

A white reflective stripe shall be provided on the interior of each cab door.

This stripe shall be a minimum of 96 in sq and shall meet the NFPA 1901 requirement.